## **Summary of Research**



Statewide Estimates of the Number of Recreational Watercraft Owned by Households in Montana

HD Unit Research Summary No. 44

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Abstract: In 2018, Montana Fish, Wildlife & Parks (FWP) cooperated with the Montana Department of Natural Resources Conservation (DNRC) to conduct a survey of Montana households. Among other things, the survey was designed to provide statewide estimates of watercraft ownership in Montana. A generalized linear model was used to estimate the number of watercraft (by type) owned by households in Montana. Table 2 on the reverse side of this research summary provides detailed statewide estimates for the numbers of sailboats; motorized ballast, inboard, and outboard boats; personal watercraft (e.g., jet skis, wave runners); canoes; kayaks; stand up paddle boards; rowboats; rafts; drift boats; paddle boats; and, personal pontoons or float tubes owned by households in Montana. To our knowledge, this is the first time detailed watercraft estimates of this type have been provided for Montana.

## **BACKGROUND INFORMATION**

In the spring of 2018, Montana Fish, Wildlife & Parks (FWP) teamed up with the Montana Department of Natural Resources Conservation (DNRC) to conduct a survey of Montana households regarding the topic of aquatic invasive species and boating/fishing use in Montana. Among other things, the survey was designed to assist with providing statewide estimates of the number of watercraft in Montana for each of the following types of watercraft: sailboats; motorized ballast, outboard, and inboard boats; personal watercraft (e.g., jet skis, wave runners); canoes; kayaks; standup paddle boards; rowboats; rafts; drift boats; paddle boats; and, personal pontoons or float tubes.

To conduct the survey, FWP purchased a random sample of N=3,000 Montana households from Survey Sampling, Inc. for this effort. Two separate mailings of the survey were sent out to the study participants: (1) an initial mailing of the survey and (2) a replacement mailing of the survey sent out to all non-respondents approximately one month after the initial mailing. Surveys were successfully delivered to 2,274 households and a nearly 30 percent survey response rate was achieved.

A generalized linear model<sup>1</sup> was used to estimate the number of watercraft (by type) owned by households in Montana. The model provides an estimate of the mean number of watercraft (by type) owned by each household in the state as well as upper and lower bound means (e.g., a confidence interval). The estimated means multiplied times the number of households in Montana equals the estimated number of watercraft (by type) found in Montana. Table 1 on the following page provides the overall estimates of watercraft owned by households in Montana.

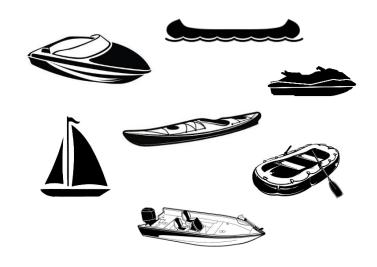
In addition to providing statewide estimates of watercraft ownership in Montana, the survey was also designed to provide estimates of the...

- Number of watercraft (by type) used this past year.
- Number watercraft (by type) used for fishing this past year.

-and-

 Number of watercraft (by type) taken out of state this past year.

The same generalized linear model was used to provide estimates for the above. Results of this analysis are provided in Table 2 on the next page.



<sup>&</sup>lt;sup>1</sup> **Generalized Linear Model (Negative Binomial with Log Link).** Specifies negative binomial (with a value of 1 for the ancillary parameter) as the distribution and log as the link function. To have the procedure estimate the value of the ancillary parameter, a custom model with negative binomial distribution and selection of estimate value in the parameter group was used. Wald confidence intervals were used to identify upper/low bound estimates.

**Table 1.** Watercraft Estimates in Montana from the 2018 Survey of Montana Households Regarding the Topic of Aquatic Invasive Species and Boating/Fishing Use in Montana.

	Estimate of the Number	95% Confidence Interval	
	of Watercraft Owned by	Lower Bound	Upper Bound
Type of Watercraft	Households in Montana	<u>Estimate</u>	<u>Estimate</u>
Sailboats	2564	962	6832
Motorized Ballast Boats	5133	2556	10315
Motorized Outboard Boats	54795	44195	67939
Motorized Inboard Boats	23280	16804	32285
Personal Watercraft (e.g., jet skis, wave runners)	12276	7773	19368
Canoes	45861	35538	59181
Kayaks	111900	94406	132503
Standup Paddle Boards (SUPs)	27129	19858	37063
Rowboats	5787	2997	11174
Rafts	33469	24819	45088
Drift Boats	9637	5810	16000
Paddle Boats	4493	2142	9427
Personal Pontoons or Float Tubes	85765	71137	103504

<sup>\*</sup>Based on 5-year estimate of the number of housholds in Montana (N=412,653 households) from Montana Census data.

**Table 2.** Estimates of the number of watercraft owned by households in Montana that were used during the past year, that were used for fishing during the past year, and were taken out of the state during the past year.

## Estimate of the number of watercraft owned by households in Montana that were...

	used	used for fishing	taken out of state
<u>Туре of Watercraft</u>	during the past year	during the past year	during the past year
Sailboats	1922	less than 25	642
Motorized Ballast Boats	4498	4498	less than 50
Motorized Outboard Boats	39080	35716	5299
Motorized Inboard Boats	20058	8370	2574
Personal Watercraft (e.g., jet skis, wave runners)	7118	655	1940
Canoes	26406	11889	656
Kayaks	84742	21298	6610
Standup Paddle Boards (SUPs)	22034	650	less than 50
Rowboats	3856	1928	less than 50
Rafts	25093	20300	650
Drift Boats	7061	7061	1284
Paddle Boats	3208	none	none
Personal Pontoons or Float Tubes	60801	13730	1959

<sup>\*</sup>Based on 5-year estimate of the number of housholds in Montana (N=412,653 households) from Montana Census data.

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